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(54) Title: HUMAN TEST BASED ON HUMAN CONCEPTUAL CAPABILIITES

Pose a Question That is Selected to  
Exercise a Human Conceptual Capability

10

Obtain an Answer and Compare it to a Correct  
Answer That Would be Rendered by a Human Being

12

(57) Abstract: A human test that is based on a human conceptual capability. A human test according to the present techniques includes posing a question that is selected to exercise a human conceptual capability, obtaining an answer to the question, and comparing the answer to a correct answer that would be rendered by a human being.

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**HUMAN TEST BASED ON HUMAN CONCEPTUAL CAPABILITIES****Technical Field**

5       The present invention relates to the field of communication. More particularly, this invention relates to testing whether a communication originates with a human being.

**Background Art**

10       A variety of circumstances may exist in computer systems and other systems in which it is desirable to use a "human test" to determine whether a communication originates with a human being or with a computer program that imitates a human being. For  
15       example, it may be desirable for a provider of a computer-related service that is intended for use by individual users, i.e. by human beings, to determine whether the computer-related service is being accessed by a computer program that imitates a human  
20       being.

      A computer program that imitates a human being in the context of web communication is commonly referred to as a "bot" which is a shortened version  
25       of "robot." Examples of computer-related services that may be intended for use by individual users in the context of web-based communication include email services, personal web page services, personal data storage services, web access accounts, etc.

30

      An unscrupulous party may employ bots to create numerous user accounts with a computer-related service that is intended for individual users. For example, an unscrupulous party may use bots to create

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- numerous user accounts with a free email service and then use the obtained email accounts for mass mailings of spam. Similarly, an unscrupulous party may use bots to create numerous free personal web
5. page accounts and then store large volumes of information on the obtained web storage space.

A provider of a computer-related service may attempt to prevent creation of user accounts by bots

10 by generating a registration form that includes a human test. A prior human test may include an image of a decimal number in a stylized fashion along with a request that the represented number be entered into a form field. Such a prior human test relies on the

15 human capability to recognize stylized numbers. Unfortunately, a bot may employ optical character recognition (OCR) techniques to defeat a human test that relies on number recognition.

DISCLOSURE OF THE INVENTION

5 A human test is disclosed that is based on a  
human conceptual capability. A human test according  
to the present techniques includes posing a question  
that is selected to exercise a human conceptual  
capability, obtaining an answer to the question, and  
comparing the answer to a correct answer that would  
be rendered by a human being.

10

Other features and advantages of the present  
invention will be apparent from the detailed  
description that follows.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention is described with respect to particular exemplary embodiments thereof and  
5 reference is accordingly made to the drawings in which:

Figure 1 shows a human test according to the present teachings;

10

Figure 2 shows a human test in a web form according to the present teachings;

Figure 3 shows a web-based system that  
15 incorporates the present teachings.

MODES FOR CARRYING OUT THE INVENTION

Figure 1 shows a human test according to the present teachings. At step 10, a question is posed  
5 that is selected to exercise a human conceptual capability. At step 12, an answer to the question is obtained and compared to a correct answer that would be rendered by a human being.

10 One example of a question that exercises a human conceptual capability is a question that exercises a image recognition capability. Another example of a question that exercises a human conceptual capability is a question that exercises a natural language  
15 processing capability. Yet another example of a question that exercises a human conceptual capability is a question that exercises a common sense reasoning capability. Another example of a question that exercises a human conceptual capability is a question  
20 that exercises a capability to recognize and parse spoken speech. A question posed at step 10 may exercise any combination of image recognition, natural language processing, spoken speech, and common sense reasoning capabilities.

25 Steps 10-12 may be repeated a number of times with different posed questions to reduce the possibility that random guessing by a bot or other human imitating mechanism will succeed in providing  
30 correct answers and being taken for a human.

Step 10 may include generating a stimulus that is perceptible by one or more human senses and posing a question pertaining to the stimulus that is

selected to exercise the human conceptual capability. For example, an image may be generated that is perceivable by the human sense of sight, e.g. an image of an object or of a living thing, and a question may be posed that pertains to the image. In another example, a sound may be generated that is perceivable by the human sense of hearing, e.g. a sound of a horse exhaling, a sound of a motorcycle roaring, and a question may be posed that pertains to a living thing or an object, e.g. a horse, a motorcycle, associated with the sound. In another example, both an image and a sound may be generated and a question may be posed that pertains to the image and sound. Multiple questions pertaining to the stimulus may be posed to reduce the chance that guessing will succeed in yielding correct answers.

A question at step 10 may be posed using spoken speech. For example, a question may be carried in an audio message. A question at step 10 may be posed using visual communication. For example, a question may be displayed in text form.

Steps 10-12 may be performed in any system that is capable of posing questions and/or generating stimuli and obtaining and verifying answers to posed questions. Examples include computer-based systems including networks of computer-based systems.

**Figure 2** shows a human test in a web form according to the present teachings. The web form in this example includes an image 22, a set of questions 30-32, and a set of radio buttons 40-46. The radio buttons 40-42 correspond to the question 30

and are labeled "Yes" and "No," respectively. The radio buttons 44-46 correspond to the question 32 and are labeled "Yes" and "No," respectively.

5           The image 22 may be an image of a common object or of a living thing. The questions 30-32 pertain to the image 22 and are questions that may be answered either yes or no using the radio buttons 40-46.

10           In the example shown, the image 22 is an image of a horse. The question 30 is "Can this jump over fences?" The question 32 is "Can this fly over mountains?" A human being viewing the web form 20 would use their visual object recognition capability  
15 to recognize the horse and use their natural language processing capability to parse the questions 30-32 and their common sense reasoning capability to conclude that a horse can jump over fences but not fly over mountains. Thus, a human being would answer  
20 the question 30 by clicking the radio button 40 and answer the question 32 by clicking the radio button 46. Additional questions pertaining to the image of the horse may be posed to reduce the likelihood that guessing will defeat the human test in the web form  
25 20.

          In an alternative to a visual display of the questions 30-32, the questions "Can this jump over fences?" and "Can this fly over mountains?" may be  
30 sounded out using an audio mechanism associated with the system or device that renders the web form 20 to a human being. This alternative exercises a human capability to recognize and parse spoken speech. The radio buttons 40-46 may still be used to provide



answers to the audio questions.

In yet another alternative, the image 22 representing a horse in the web form 20 may be replaced with a sound associated with a horse, e.g. an audible sound made by a horse.

A human test in a web form according to the present techniques may include one or more questions and corresponding yes/no radio buttons without an image or sound to which the questions pertain. For example, using the same concepts as above, the questions "Can a horse jump over fences?" and "Can a horse fly over mountains" may be posed. This may be used for a human being having both visual and auditory impairments. In another example, a question that is selected to exercise a human capability to recognize and parse spoken speech such as "Is today Tuesday?" may be posed. The question may be provided in a web form either visually or using audio spoken speech.

A human test in a web form according to the present techniques may include one or more questions each having a corresponding input field in the web form. For example, a question that is selected to exercise human capabilities such as "How much is 1+1?" may be posed. The question may be provided in a web form either visually or using audio spoken speech. The answer would be entered by a human being into the input field of the web form.

A web form according to the present techniques may include a set of radio buttons each corresponding

to a possible answer to a posed question. For example, the question "Which country is New York City in?" may be posed and one radio button may be labeled "USA" and another radio button may be labeled "France" and another radio button may be labeled "Russia," etc.

Figure 3 shows a web-based system 100 that incorporates the present teachings. The system 100 includes a service provider 120 that provides a computer-related service via a network 102. The computer-related service is intended for use by individual users, i.e. by human beings. For example, the service provider 120 may include a web server including web forms that enable registration and access to the computer-related service.

Any one or more of a set of client systems 110-116 may attempt to subscribe to the computer-related service of the service provider 120. For example, a human being may use one of the client systems 110-116 to subscribe to the computer-related service of the service provider 120. In addition, a software program, i.e. a bot, running on any one of the client systems 110-116 may attempt to subscribe to the computer-related service of the service provider 120.

The client systems 110-116 use web protocols to obtain a registration form from the service provider 120 when attempting to subscribe to the computer-related service. For example, an individual user may use a web browser functionality of the client system 110 to obtain the registration form by clicking a button, hyperlink, etc., in a web page generated by

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the service provider 120 and a bot running on the client system 112 may obtain the registration form by analyzing a web page generated by the service provider 120 and extracting a URL for the registration form and then issuing HTTP get commands to obtain the registration form.

The registration form generated by the service provider 120 may include a human test according to the present techniques or may be shielded by a form containing a human test according to the present techniques. A human being using the client system 110 may view the registration form on a local display of the client system 110 and/or listen to audio content associated with the registration form via an audio subsystem of the client system 110. A human being using the client system 110 may employ a user input mechanism of the client system 110 to enter answers by clicking radio buttons and/or making entries into fields in the registration form.

The service provider 120 generates a human test by obtaining pre-selected images and/or sounds including pre-selected questions and their corresponding answers from a data store 130. The data store 130 may provide a relatively large variety of material for posing questions which may be used to provide variability in human tests and hinder attempts to discover and re-use human test answers. The data store 130 may be any type of store, e.g. a persistent storage media. In addition, the size, shape, colors, etc., of images to which posed question pertain may also be varied when generating a registration form.

Examples of a computer-related service of the service provider 120 that is designed for use by individual users include email services, personal web  
5 pages, personal data storage, web access accounts, ordinary user accounts etc.

A human test according to the present techniques may include measuring the time spent by a subject,  
10 e.g. a human or a bot, in answering the questions posed. Humans tend to process information more slowly than bots. Thus, if the time spent answering a posed question is very short, e.g. less than a second per question, then it may be concluded that a bot is  
15 answering the question rather than a human. For example, a registration form according to the present techniques may include an applet that measures response time to questions.

20 A human test according to the present techniques may be adapted to humans having disabilities, e.g. visual, auditory impairments, by stimulating different senses. For example, a question may be posed visually or may be sounded out. This is in  
25 contrast to prior visual systems which may not accommodate the blind.

The foregoing detailed description of the present invention is provided for the purposes of  
30 illustration and is not intended to be exhaustive or to limit the invention to the precise embodiment disclosed. Accordingly, the scope of the present invention is defined by the appended claims.

CLAIMS

What is claimed is:

- 5 1. A human test, comprising the steps of:  
posing a question (30,32) that is selected to  
exercise a human conceptual capability;  
obtaining an answer to the question (30,32) and  
comparing the answer to a correct answer that would  
10 be rendered by the human being.
2. The human test of claim 1, wherein the step of  
posing a question (30,32) comprises the step of  
posing a question that is selected to exercise an  
15 image recognition capability.
3. The human test of claim 1, wherein the step of  
posing a question (30,32) comprises the step of  
posing a question that is selected to exercise a  
20 capability to recognize spoken speech.
4. The human test of claim 1, wherein the step of  
posing a question (30,32) comprises the step of  
posing a question that is selected to exercise a  
25 natural language processing capability.
5. The human test of claim 1, wherein the step of  
posing a question (30,32) comprises the step of  
posing a question that is selected to exercise a  
30 common sense reasoning capability.
6. The human test of claim 1, wherein the step of  
posing a question (30,32) comprises the step of  
posing a question that is selected to exercise any

combination of image recognition and spoken speech recognition and natural language processing and common sense reasoning capabilities.

- 5     7.    The human test of claim 1, wherein the step of posing a question (30,32) comprises the step of posing a question using speech communication.
- 10    8.    The human test of claim 1, wherein the step of posing a question (30,32) comprises the step of posing a question using visual communication.
- 15    9.    The human test of claim 1, wherein the step of posing a question (30,32) comprises the step of posing a question using a communication that is adapted to a human having an impairment.
- 20    10.   The human test of claim 1, wherein the step of posing a question (30,32) comprises the steps of:  
generating a stimulus that is perceptible by one or more human senses;  
posing a question pertaining to the stimulus that is selected to exercise the human conceptual capability.
- 25    11.   The human test of claim 10, wherein the step of generating a stimulus comprises the step of generating an image.
- 30    12.   The human test of claim 10, wherein the step of generating a stimulus comprises the step of generating a speech communication.
13.   The human test of claim 10, wherein the step of

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generating a stimulus comprises the step of  
generating a sound.

14. The human test of claim 1, further comprising  
5 the step of measuring a time taken by a subject of  
the human test to provide the answer.

15. A computer-readable storage media that holds a  
set of information for performing a human test by  
10 posing a question (30,32) that is selected to  
exercise a human conceptual capability.

16. The computer-readable storage media of claim 15,  
wherein the information includes a set of possible  
15 questions from which the question (30,32) may be  
selected.

17. The computer-readable storage media of claim 15,  
wherein the information includes an image that poses  
20 the question (30,32).

18. The computer-readable storage media of claim 15,  
wherein the information includes a sound that poses  
the question (30,32).

25

19. The computer-readable storage media of claim 15,  
wherein the information includes an image to which  
the question (30,32) pertains.

30 20. The computer-readable storage media of claim 15,  
wherein the information includes a sound to which the  
question (30,32) pertains.

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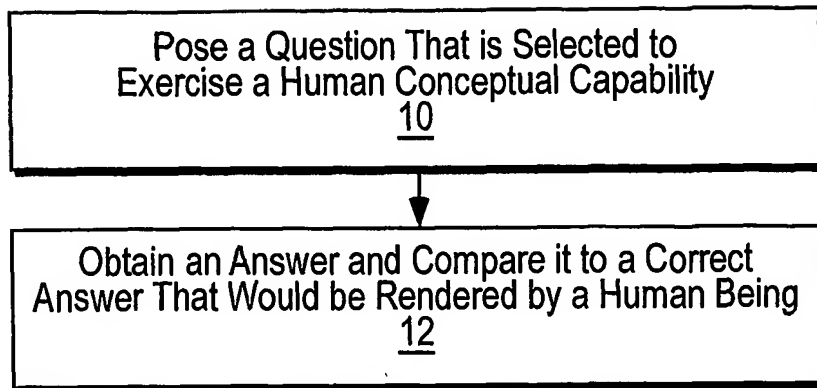


FIG. 1

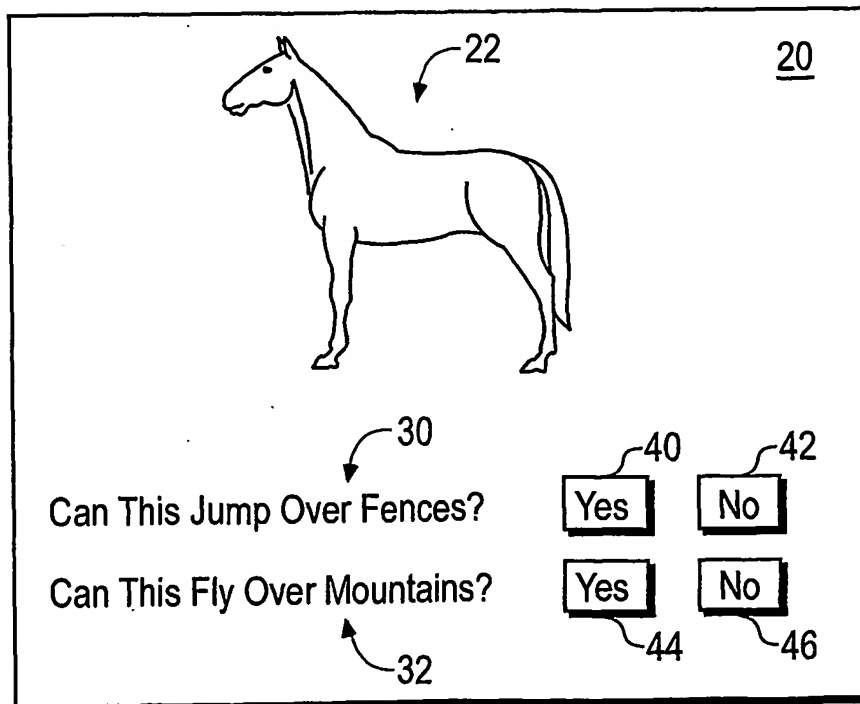


FIG. 2



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